to satisfactory testing by the procedures and methods in this section. For example, the Administrator may prescribe alternative air conditioning system settings for systems with controls that are not able to meet the requirements in this section.

[75 FR 25680, May 7, 2010]

§ 86.166–12 Method for calculating emissions due to air conditioning leakage.

This section describes procedures used to determine a refrigerant leakage rate in grams per year from vehicle-based air conditioning units. The results of this test are used to determine air conditioning leakage credits according to § 86.1866–12(b).

(a) *Emission totals.* Calculate an annual rate of refrigerant leakage from an air conditioning system using the following equation:

$$\text{Grams/YR}_{TOT} = \text{Grams/YR}_{RP} + \text{Grams/YR}_{SP} + \text{Grams/YR}_{FH} + \text{Grams/YR}_{MC} + \text{Grams/YR}_{C}$$

Where:

Grams/YR_{TOT} = Total air conditioning system emission rate in grams per year and rounded to the nearest tenth of a gram per year.

Grams/YR_{RP} = Emission rate for rigid pipe connections as described in paragraph (b) of this section.

Grams/YR_{SP} = Emission rate for service ports and refrigerant control devices as described in paragraph (c) of this section.

Grams/YR_{FH} = Emission rate for flexible hoses as described in paragraph (d) of this section.

Grams/YR_{MC} = Emission rate for heat exchangers, mufflers, receiver/driers, and accumulators as described in paragraph (e) of this section.

Grams/YR_{C} = Emission rate for compressors as described in paragraph (f) of this section.

(b) *Rigid pipe connections.* Determine the grams per year emission rate for rigid pipe connections using the following equation:

$$\text{Grams/YR}_{RP} = 0.00522 \times [(125 \times SO) + (75 \times SCO) + (50 \times MO) + (10 \times SW) + (5 \times SWO) + (MG)]$$

Where:

Grams/YR_{RP} = Total emission rate for rigid pipe connections in grams per year.

SO = The number of single O-ring connections.

SCO = The number of single captured O-ring connections.

MO = The number of multiple O-ring connections.

SW = The number of seal washer connections.

SWO = The number of seal washer with O-ring connections.

MG = The number of metal gasket connections.

(c) *Service ports and refrigerant control devices.* Determine the grams per year emission rate for service ports and refrigerant control devices using the following equation:

$$\text{Grams/YR}_{SP} = 0.522 \times [(0.3 \times HSSP) + (0.2 \times LSSP) + (0.2 \times STV) + (0.2 \times TXV)]$$

Where:

Grams/YR_{SP} = The emission rate for service ports and refrigerant control devices, in grams per year.

HSSP = The number of high side service ports.

LSSP = The number of low side service ports.

STV = The total number of switches, transducers, and pressure relief valves.

TXV = The number of refrigerant control devices.

(d) *Flexible hoses.* Determine the permeation emission rate in grams per year for each segment of flexible hose using the following equation, and then sum the values for all hoses in the system to calculate a total flexible hose emission rate for the system. Hose end connections shall be included in the calculations in paragraph (b) of this section.

$$\text{Grams/YR}_{FH} = 0.00522 \times (3.14159 \times ID \times L \times ER)$$

Where:

Grams/YR_{FH} = Emission rate for a segment of flexible hose in grams per year.

ID = Inner diameter of hose, in millimeters.

L = Length of hose, in millimeters.

ER = Emission rate per unit internal surface area of the hose, in g/mm^2. Select the appropriate value for ER from the following table:

Material/configuration	ER	
	High-pressure side	Low-pressure side
All rubber hose	0.0216	0.0144

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Material/configuration	ER	
	High-pressure side	Low-pressure side
Standard barrier or veneer hose	0.0054	0.0036
Ultra-low permeation barrier or veneer hose	0.00225	0.00167

(e) *Heat exchangers, mufflers, receiver/driers, and accumulators.* Use an emission rate of 0.261 grams per year as a combined value for all heat exchangers, mufflers, receiver/driers, and accumulators (Grams/YR$_{MC}$).

(f) *Compressors.* Determine the emission rate for compressors using the following equation, except that the final term in the equation (''1500/SSL'') is not applicable to electric (or semi-hermetic) compressors:

Grams/YR$_C$ = 0.00522 × [(300 × OHS) + (200 × MHS) + (150 × FAP) + (100 × GHS) + (1500/SSL)]

Where:

Grams/YR$_C$ = The emission rate for the compressors in the air conditioning system, in grams per year.
OHS = The number of O-ring housing seals.
MHS = The number of molded housing seals.
FAP = The number of fitting adapter plates.
GHS = The number of gasket housing seals.
SSL = The number of lips on shaft seal (for belt-driven compressors only).

(g) *Definitions.* The following definitions apply to this section:

(1) *All rubber hose* means a Type A or Type B hose as defined by SAE J2064 with a permeation rate not greater than 15 kg/m²/year when tested according to SAE J2064. SAE J2064 is incorporated by reference; see § 86.1.

(2) *Standard barrier or veneer hose* means a Type C, D, E, or F hose as defined by SAE J2064 with a permeation rate not greater than 5 kg/m²/year when tested according to SAE J2064. SAE J2064 is incorporated by reference; see § 86.1.

(3) *Ultra-low permeation barrier or veneer hose* means a hose with a permeation rate not greater than 1.5 kg/m²/year when tested according to SAE J2064. SAE J2064 is incorporated by reference; see § 86.1.

[75 FR 25681, May 7, 2010]

Subpart C—Emission Regulations for 1994 and Later Model Year Gasoline-Fueled New Light-Duty Vehicles, New Light-Duty Trucks and New Medium-Duty Passenger Vehicles; Cold Temperature Test Procedures

§ 86.201–94 General applicability.

(a) This subpart describes procedures for determining the cold temperature carbon monoxide (CO) emission from 1994 and later model year new gasoline-fueled light-duty vehicles and light-duty trucks.

(b) All of the provisions of this subpart are applicable to testing conducted at a nominal temperature of 20 °F (−7 °C).

(c) The provisions that are specially applicable to testing at temperatures between 25 °F (−4 °C) and 68 °F (20 °C) are specified in § 86.246–94 of this subpart.

§ 86.201–11 General applicability.

(a) This subpart describes procedures for determining the cold temperature carbon monoxide (CO) emissions from 1994 and later model year new gasoline-fueled light-duty vehicles and light-duty trucks, and for emissions sampling for determining fuel economy according to part 600 of this chapter for 2011 and later model year new gasoline-fueled and diesel-fueled light-duty vehicles and light-duty trucks.

(b) All of the provisions of this subpart are applicable to testing conducted at a nominal temperature of 20 °F (−7 °C).

(c) The provisions that are specifically applicable to testing at temperatures between 25 °F (−4 °C) and 68 °F (20 °C) are specified in § 86.246–94 of this subpart.

[71 FR 77922, Dec. 27, 2006]